CARE Technology

Smart Home System for the Elderly

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http://www.elite-care.com

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NIST Pervasive Computing 2001

Gaithersburg, Maryland

Elite Care Background

- Integrated construction, management, and technology company--entrepreneurial
- Fundamentally change housing and health care for the elderly
- Social model vs. institutional model of long term care
- Resident empowerment
- Environment to match resident preferences
- Not keen on rigid policies and procedures

Advisory Committee, 1999-present

- Experts in the field
  - interdisciplinary
- Dr. Eric Tangalos, Mayo
- Dr. Ellen Langer, Harvard
- Dr. Ken Brummel-Smith, Providence
- Dr. Richard Beckwith, Intel
- Sandia National Laboratory
- Others interested in model and technology
  - Architects, nurse, bodywork, gerontechnology

Extended Family Residences™

- Residential Scale and Design
- 12 residents + live-in staff
- $3,250/month
- Opened September, 2000, at Oatfield Estates
- Potential for 10 on property
- "High tech, high touch" smart home

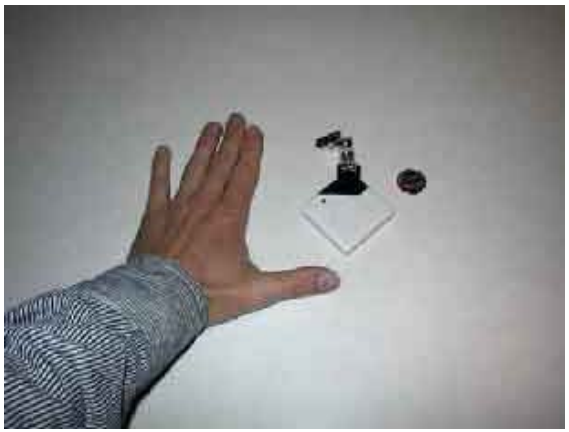
Why Technology?

- Automated quality control
- Biofeedback
- Early warning system for health problems
- Enhance social networks
- Prolong independence
- Store daily resident information in database to combat staff turnover problems
- Only 20% of philosophy, but crucial for success

System Components

- Networked personal computers with touch screen interface
- Shared microwave Internet link (1.5 Mb connection)
- Unobtrusive sensors on walls, ceilings, beds, (toilet?), lights, appliances
- IR/RF ID tag worn by residents
- Programmable Logic Controller
- SQL server (database)—institutional memory
- Application and integration of existing technologies

Some System Components



Location

Weight, Restlessness,
Sleep Patterns

- Unobtrusive,
- Integrated,
- Inexpensive,
- Tested

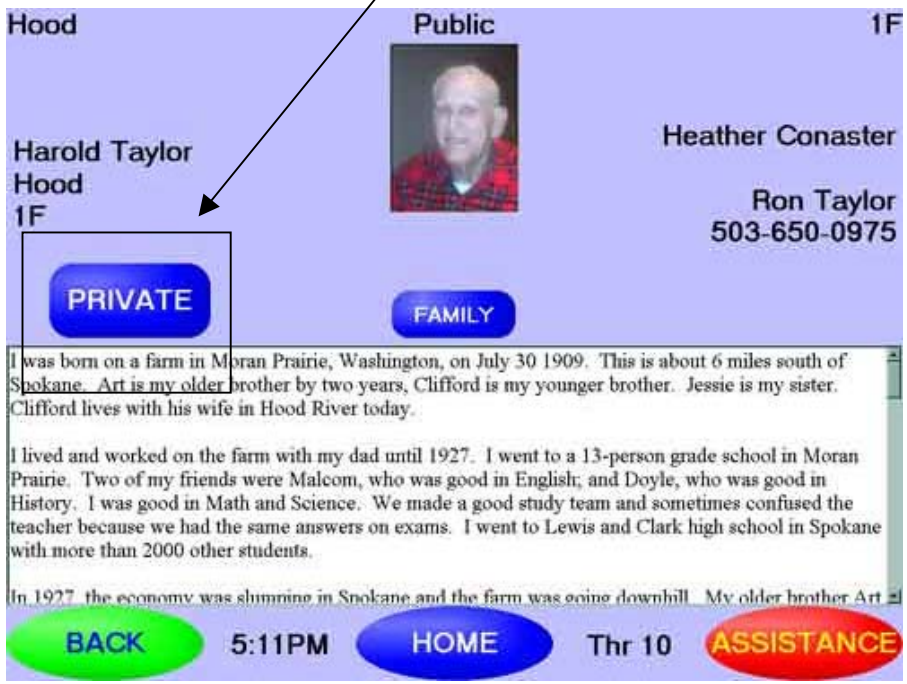
PLC

Information Gathered

- “Health”
- “Movement”—the badge
- “Environmental”
- “Commonality Assessment”
- Stored in SQL Server

Interface

Personal Info



Programmed in VB, Touch Screen, Icons, Videoconferencing, Voice Recognition

Some Numbers for One House

- 30 miles of wiring
- > 300 relays
- 20 control boxes
- 18 networked computers
- Fiber optics to SQL database

Major Uses

- Alert authorized parties when parameters exceeded
  - Trends in health indicators through sensors and manual input
- Nurse call/location tracking through badge
  - Staff and residents
- Communication tool via Internet
- Prompts and cues as “cognitive crutch”

Other Uses

- Regulate and monitor environmental conditions
- Reduce paperwork so staff can pursue true calling

End Users

- Residents
- Families
- Physicians and health care entities
- Management and staff
- Researchers

Challenges, Successes, the Future

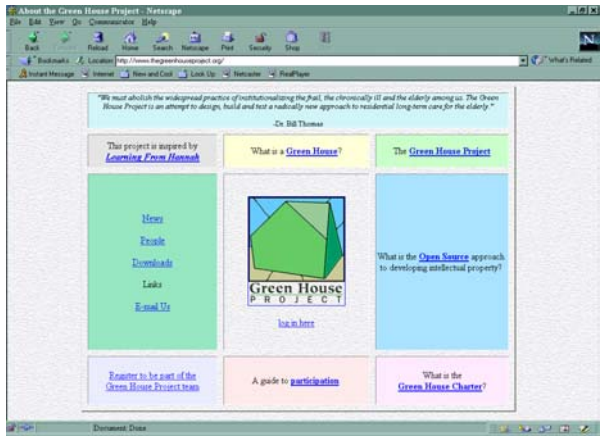
- Challenges
  - Reliable infrastructure/networking
  - Marketing innovative concept
  - Acceptability to residents
  - Finding most appropriate technologies for low cost
- Successes
  - Philosophical justification for technology
  - Hard wire paths operational for low cost
  - Residents/staff applying technology in real life setting; catch errors now
  - PR (Computerworld Honors, *NY Times, Atlantic Monthly*, local press, tours from around the world)
- The Future
  - Other facilities
  - Home market; populations who feel that living alone is a risk
  - FDA

Issues

- Does access to health information provide more personal control?
- Attractiveness to potential residents? Big Brother? Privacy?
- What do physicians value?
- Cost-benefit ratio?
- Needs: Data mining for correlation
  Medical analysis
  User Interface

Smart Home Initiatives

- Large and small scale
- http://www.research.microsoft.com/ierp/
- listserv@mitvma.mit.edu



Green House

GA Tech Aware Home

MIT House_*n*

No Stereotypes

Questions? http://www.elite-care.com